

Remarks

Claims 1-54 are pending in the present case and are rejected.

Claim 1 is amended to correct a typo. The word "is" is replace with "are."

1. **Rejections Under 35 U.S.C. § 103(a)**

Claim 1-9, 11-15, 18-26, 29-34, 36-43, 45 and 46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Stollenwerk et al. (U.S. Patent No. 6,150,030) (Stollenwerk) in view of Ando et al. (U.S. Patent No. 6,458,253).

Applicants respectfully traverse this rejection for the reasons set forth below. As set forth in the Amendment filed October 20, 2005, Stollenwerk is a deficient reference since it fails to disclose a working gas emanating from a nozzle placed in the channel defined by one or more target surfaces as required by independent claims 1, 22, 36, and 47. Such gas flows through the channel in a non-laminar manner resulting in a very significant increase in film deposition rates in both reactive and non-reactive modes as evidenced by Figures 7 and 8 of the present invention. It is clear from Figure 1 and the related description in Stollenwerk that Stollenwerk does not seek to induce turbulence in the channel. Instead, Stollenwerk induces turbulence before the channel most likely to encourage mixing. One skilled in the art of fluid dynamics would readily recognize that the turbulence of Stollenwerk would tend to be damped and revert to laminar flow in the channel.

The Examiner now attempts to remedy this deficiency by combining Stollenwerk with Ando et. al. However, such a combination of these references is completely inappropriate. The Examiner describes Ando as follows:

Ando et al. teach locating a nozzle at the end of the target channel but still located with the target channel. The working

gas is made up of the anode 41 through which the working gas is introduced from the feed source 30.

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The Examiner goes on to provide the following alleged motivation for combining Ando with Stollenwerk:

The motivation for introducing the sputtering gas within the channel but located at an end of the channel is that it allows for preventing reactive gas from entering the channel to contaminate the target surface.(column 9 lines 29-38)

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The Examiner's analysis is severely defective for a number of reasons. Ando is completely silent on the issue of turbulence or non-laminar flow. The passage relied upon by the Examiner for providing motivation for the combining of Ando with Stollenwerk has been incorrectly interpreted. The cited lines are reproduced as follows:

The target, when fluorinated by the fluorine-containing gas, tends to generate negative ions during sputtering. In the present embodiment, the sputtering gas is supplied through the anode that forms the bottom surface of the substantially cylindrical target surrounding the discharge space, thereby **establishing an environment in which the space inside the substantially cylindrical target is filled with the sputtering gas. This makes it difficult for the reactive gas to intrude into the substantially cylindrical target**, so that the target can be sputtered while maintaining its metal state.

Ando, col. 9, ll. 29-38 (emphasis added)

It is clear that it is not the positioning of the nozzle in the channel that inhibits reactive gas from entering the channel. Instead, it is the flowing of a continuous stream of gas through the channel which inhibits reactive gas from entering the channel. This is a feature of the present invention, Stollenwerk and Ando that has nothing to do with the positioning of the nozzle within the channel per se. Any configuration that introduces a flowing gas into the channel

will reduce such contamination. Simply put, flowing gas through a channel will reduce contaminates from entering the end from which the gas exits the channel.

Notwithstanding this analysis, Stollenwerk is incompatible with Ando. Regarding the generation of turbulence Stollenwerk states:

An inventive and preferred coating arrangement for preferably performing the inventive method is proposed which comprises:

two Mg-targets mutually defining a slit and made of Mg-material with a purity of at least 99%;

at a first end area of the slit an anode arrangement and a gas feed arrangement connected to a gas tank arrangement containing a working gas, **the gas nozzles of which being so directed that the gas is inlet not directly between the targets but towards the end thereof so as to result in turbulences;**

a substrate carrier and conveyor arrangement with which a planar substrate is moved over and past said slit, distant from a second slit end area which is opposite to said first slit end area;

a further gas feed arrangement acting into the space between said second slit end area and said substrate carrier and conveyor arrangement, which further gas feed arrangement being connected to a gas tank arrangement for a reactive gas containing oxygen.

Stollenwerk, col. 3, ll. 28-47

Stollenwerk generates turbulence in a different manner than in the present invention. Specifically, gas is directed to the inlet so that **the gas is not directly between the targets**. If Stollenwerk is combined with Ando in the manner suggested by the Examiner the gas is necessarily between the targets. Therefore, Ando cannot properly be combined with Stollenwerk.

Accordingly, for at least these reasons, claims 1-9, 11-15, 18-26, 29-34, 36-43, 45 and 46 are patentable under 35 U.S.C. § 103(a) over Stollenwerk in view of Ando.

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Stollenwerk et al. in view of Ando et al. and further in view of U.S. Patent No. 5,810,982 to Sellers.

Claim 10 depends from independent claim 1 which is shown above to be allowable. Accordingly, claim 10 is patentable over Stollenwerk in view of Ando and further in view of Sellers.

Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Stollenwerk et al. in view of Ando et al. and further in view of THIN FILM PROCESSES by Vossen et al. (Vossen).

Claim 17 depends from independent claim 1 which is shown above to be allowable. Accordingly, claim 10 is patentable over Stollenwerk in view of Ando and further in view of Vossen.

Claims 16 and 44 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Stollenwerk et al. in view of Ando et al. and further in view of Kadokura (U.S. Patent No. 6,156,172).

Claims 16 and 44 depend from independent claim 1 which is shown above to be allowable. Accordingly, claim 10 is patentable over Stollenwerk in view of Ando and further in view of Kadokura.

Claim 1-9, 11-15, 18-43 and 47-54 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,889,295 to Rennie et al. (Rennie) in view of U.S. Patent No. 6,150,030 to Stollenwerk et al. (Stollenwerk) and U.S. Patent No. 6,458,253 to Ando et al.

The deficiencies of the combination of Stollenwerk and Ando regarding the generation of turbulence and position of the working gas nozzle in a channel is set forth above. Rennie in no way remedies these deficiencies, and is merely utilized by the Examiner to provide a reference for forming Al-doped ZnO and AlN by sputtering.

Accordingly, for at least this reason, claim 1-9, 11-15, 18-43 and 47-54 are patentable under 35 U.S.C. § 103(a) over Rennie in view of Stollenwerk and Ando.

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,889,295 to Rennie et al. (Rennie) in view of U.S. Patent No. 6,150,030 to Stollenwerk et al. (Stollenwerk) and U.S. Patent No. 6,458,253 to Ando et al. as applied to claim 1 above, and further in view of U.S. Patent No. 5,810,982 to Sellers.

Claim 10 depends from independent claim 1 which is shown above to be allowable. Accordingly, claim 10 is patentable over Rennie in view of Stollenwerk, and Ando and further in view of Sellers.

Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,889,295 to Rennie et al. (Rennie) in view of U.S. Patent No. 6,150,030 to Stollenwerk et al. (Stollenwerk) and U.S. Patent No. 6,458,253 to Ando et al. as applied to claims 1 and 13 above, and further in view of THIN FILM PROCESSES by Vossen et al. (Vossen).

Claim 17 depends from independent claim 1 which is shown above to be allowable. Accordingly, claim 17 is patentable over Rennie in view Stollenwerk and Ando, and further in view of Vossen.

Claims 16 and 44 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,889,295 to Rennie et al. (Rennie) in view of U.S. Patent No. 6,150,030 to Stollenwerk et al. (Stollenwerk) and U.S. Patent No. 6,458,253 to Ando et al. (Ando) as applied to claims 1, 13, 36 and 41 above, and further in view of Kadokura (U.S. Patent No. 6,156,172).

Claims 16 and 44 depend from independent claims 1 and 47 which are shown to be allowable. Accordingly, claims 16 and 44 are patentable over Rennie in view Stollenwerk and Ando and further in view of Kadokura.

Conclusion

Applicants have made a genuine effort to respond to each of the Examiner's rejections in advancing the prosecution of this case. Applicants believe that all formal and substantive requirements for patentability have been met and that this case is in condition for allowance, which action is respectfully requested. If a telephone or video conference would help expedite allowance or resolve any additional questions, such a conference is invited at the Examiner's convenience.


S/N: 10/635,344
Reply to Office Action of January 6, 2006

Atty Dkt No. ENPI 0101 PUS

A check in the amount of \$225.00 is enclosed to cover the Petition for a two-month extension of time. Please charge any additional fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978.

Respectfully submitted,

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